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Giant Liver Flukes in Elk

Flukes can cause liver damage in free-living and captive populations of elk, white-tailed deer and other ungulate species. They rarely cause direct mortality but may contribute to slower growth and reduced productivity. As for domestic animals, liver flukes in sheep can be fatal while infection in cattle may lead to condemnation of the liver.

Cause

Giant liver fluke, *Fascioloides magna*, is the primary cause worm-like infections in the liver of game farm species. It is a large (30x80 mm) flat worm that migrates through liver tissue in search of another fluke. When two flukes find each other, they stop migrating. This allows the infected host (i.e., elk or deer) to surround the pair of worms in a fibrous tissue capsule (figure 1).

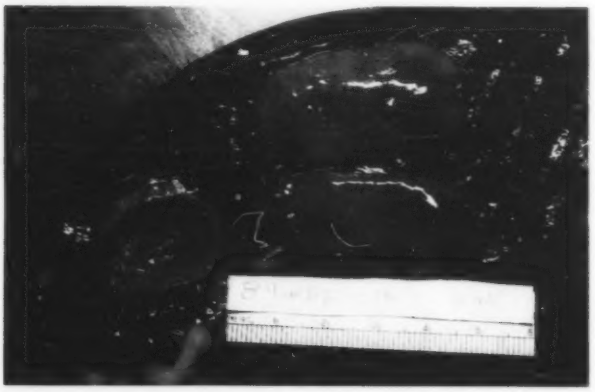

Figure 1. Two adult giant liver flukes in an elk liver. Note the fibrous capsule on left.

Spread and transmission

Flukes release eggs into bile in the liver, which drains into the intestine. From there, the eggs pass out of the host along with the fecal pellets. The eggs hatch in water and the fluke larvae enter an aquatic snail. After four to six weeks, larvae leave the snail and encyst on aquatic plants. The life cycle is completed when an ungulate eats plants contaminated with fluke larvae. The spread of flukes is focused around wetland areas because aquatic snails are required by flukes to complete their life cycle.

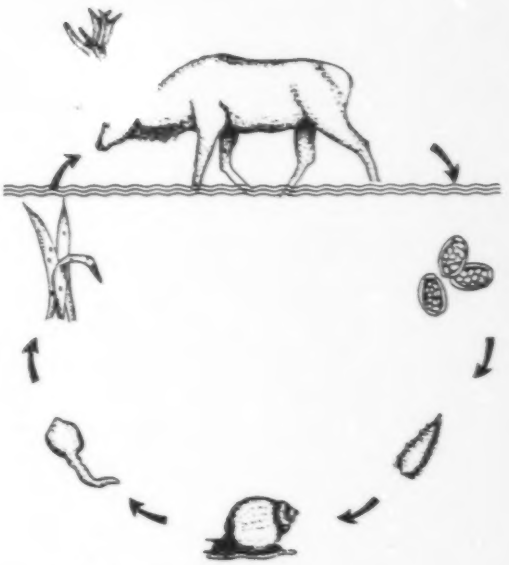

Figure 2. Life cycle of *Fascioloides magna*.

Infected animals can easily spread giant liver flukes to previously uninfested wetlands. Liver flukes are found in the foothills from the North Saskatchewan River to the Canada-U.S. border. They are also found in the Cypress Hills and in pockets near Edmonton and St. Paul. Most non-alkali waterbodies in central and southern Alberta can provide habitat for the fluke.

Signs

It is unclear whether animals infected with giant liver fluke can be identified by specific clinical signs. Capsules, flukes, and tissues damaged during the migration phase interfere with normal liver functions (figure 3), but this often is difficult to detect by looking at the animal. Heavy fluke infections cause the liver to increase in size and fluids to build-up in the abdominal cavity. A distended belly and sagging bellyline are signs of this level of infection. Such animals often are slow-moving and somewhat depressed; however the majority of liver fluke infections are not apparent by visual inspection. Infected livers will be condemned at slaughter.

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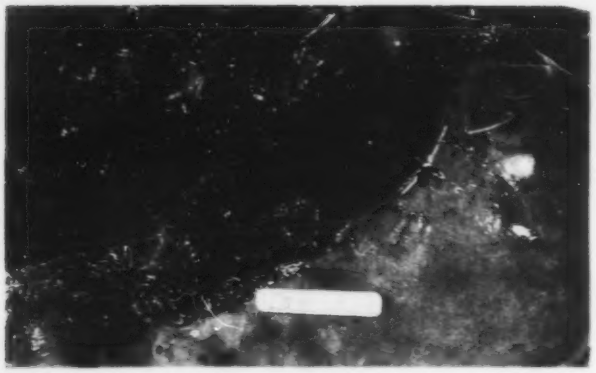

Figure 3. Damaged liver tissue from an infected elk.

Diagnosis

An infection of adult liver flukes may be detected by looking for eggs in fecal pellets. Fecal samples should be collected fresh and kept cool if they will be evaluated within three or four days; otherwise the samples should be frozen until they can be tested.

Veterinarians use a combined sedimentation and flotation test to detect liver flukes. The eggs of giant liver flukes are heavy and a 2M Sheather's sugar solution is required to make them float.

Post mortem diagnosis relies on recovery of worms or evidence of damage to the liver. Adult flukes are found within white fibrous capsules. Immature flukes (5 to 50 mm long) often are found within bloody tracks as they migrate through the liver tissue.

A principle feature of giant liver fluke infection is the deposition of black pigment, often in streaks, through the liver tissue (figure 4). The flukes feed on blood and the pigment is likely an iron compound, resulting from the destruction of red blood cells. The presence of black pigment is considered a sure sign of giant liver fluke infection.

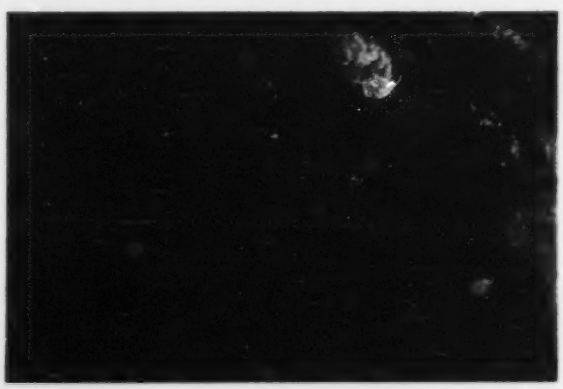

Figure 4. Black pigment streak caused by a giant liver fluke infection.

Treatment

Triclabendazole has proven to be effective against giant liver fluke in elk and white-tailed deer. Currently, it is not licensed in Canada but is available to veterinarians as a medical emergency drug. Triclabendazole is marketed by Ciba-Geigy as Fasinex®.

The recommended treatment for elk involves administering an oral drench of Fasinex® at 50 to 60 mg/kg body weight. It is effective against immature and adult flukes and thus treatment in spring and fall (after the primary periods of transmission) is likely the most effective time to treat.

Albendazole, often used to treat fluke infections in cattle, is of limited use in treating elk and white-tailed deer. In Texas, albendazole-treated corn is used to limit (but not eliminate) fluke infections in white-tailed deer. Albendazole has only limited effect on immature giant liver flukes.

Control

Infections can be prevented if game farm animals do not have access to waterbodies where snails and plants abound. It is impractical and undesirable to drain wetlands in spite of their importance to the transmission of giant liver flukes. Controlled burning of grasses and rushes in the spring may help to reduce the number of larvae available to grazing elk and deer when the use of wetland areas cannot be avoided.

In general, giant liver flukes are not a problem for free-ranging elk or white-tailed deer. However, in captive situations, they have the potential to build up in a herd due to the high stocking density and continual shedding of eggs from infected animals into the same small area. Thus captive animals will eat more larvae and get heavier infections that may impair individual health and productivity. Pasture management and husbandry techniques should be aimed at avoiding or treating infections.

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